

**WHAT IS CLAIMED IS:**

1           1.       A method for a thermo-electric cooler coupled to a laser diode, the  
 2 method comprising:  
 3           operating the thermo-electric cooler in one of at least a low power mode and a  
 4           standard mode, the laser diode configured to transmit signals in the low  
 5           power mode and the standard mode; and  
 6           switching between the low power mode and the standard mode, wherein:  
 7           the low power mode maintains a laser diode at a temperature within a  
 8           predetermined range of temperatures; and  
 9           the standard mode maintains the laser diode at a temperature that  
 10           corresponds to a predetermined wavelength of light output from  
 11           the laser diode.

1           2.       The method of claim 1 wherein the low power mode is a Time  
 2 Division Multiplexing (TDM) mode.

1           3.       The method of claim 1 wherein the standard mode is a Dense  
 2 Wavelength Division Multiplexing (DWDM) mode.

1           4.       The method of claim 1 further comprising:  
 2           operating the thermo-electric cooler in a quasi-standard mode, the laser diode  
 3           configured to transmit signals in the quasi-standard power mode.

1           5.       The method of claim 1 wherein laser diode is configured in an OC-192  
 2 transceiver line card disposed in a synchronous optical network (SONET)  
 3 communication system.

1           6.       The method of claim 1 wherein the predetermined range of  
 2 temperatures is a range of temperatures within which the laser diode has a user-  
 3 defined power versus performance ratio.

1           7.       The method of claim 1 wherein the predetermined range of  
 2 temperatures are input by one of a user and a system generated source.

1           8.       The method of claim 1 wherein the predetermined range of  
2       temperatures is determined by a user setting a temperature measure above and below  
3       a fixed temperature that corresponds to a wavelength of light output from the laser  
4       diode.

1           9.       An apparatus comprising:  
2       means for operating a thermo-electric cooler coupled to a laser diode in one of  
3       a low power mode and a standard mode; and  
4       means for switching between the low power mode and the standard mode,  
5       wherein the low power mode maintains the laser diode at a temperature  
6       within a predetermined range of temperatures and the standard mode  
7       maintains the laser diode at a temperature that corresponds to a  
8       predetermined wavelength of light output from the laser diode.

1           10.      The apparatus of claim 9 wherein the predetermined range of  
2       temperatures is determined by a user setting a temperature measure above and below  
3       a fixed temperature that corresponds to a wavelength of light output from the laser  
4       diode.

1           11.      The apparatus of claim 9 wherein the low power mode is a Time  
2       Division Multiplexing (TDM) mode.

1           12.      The apparatus of claim 9 wherein the standard mode is a Dense  
2       Wavelength Division Multiplexing (DWDM) mode.

1           13.      The apparatus of claim 9 wherein laser diode is configured in an OC-  
2       192 transceiver line card disposed in a synchronous optical network (SONET)  
3       communication system.

1           14.      An optical transceiver comprising:  
2       a temperature circuit;  
3       a thermo-electric cooler coupled to the temperature circuit; and

4 a laser diode coupled to the thermo-electric cooler, wherein the thermo-  
5 electric cooler is responsive to inputs from the temperature circuit, the  
6 inputs identifying one of at least a first mode and a second mode,  
7 wherein a choice of mode is a function of a performance requirement.

1 15. The optical transceiver of claim 14 wherein the performance  
2 requirement is one of the first mode, wherein the first mode is a standard mode for  
3 dense wavelength division multiplexing (DWDM) applications, and the second mode,  
4 wherein the second mode is a low-power mode for time domain multiplexing (TDM)  
5 applications.

1 16. The optical transceiver of claim 14, further comprising:  
2 a temperature circuit, the temperature circuit including a switch configured to  
3 alter the thermo-electric cooler between the first mode and the second  
4 mode.

1 17. The optical transceiver of claim 14 wherein the second mode is a dense  
2 wavelength division multiplexing (DWDM) mode and the first mode is a time-  
3 division multiplexed (TDM) mode.

1 18. The optical transceiver of claim 14 further comprising:  
2 a coupler coupled to the laser diode, the lens producing an optical signal; and  
3 an optical fiber coupled to the coupler; and  
4 a wavelength signal circuit coupled to the coupler and the temperature circuit,  
5 the wavelength signal circuit configured to transmit feedback to the  
6 temperature circuit to maintain a stable wavelength of the laser diode.

1 19. The optical transceiver of claim 14 wherein the optical transceiver is  
2 disposed on an OC-192 transceiver line card of a synchronous optical network  
3 (SONET) communication system.

1 20. The optical transceiver of claim 14 wherein the first mode is a low-  
2 power mode and the second mode is a standard mode, the first mode configured to  
3 permit a predetermined amount of wavelength drift.

1           21.     The optical transceiver of claim 14 wherein the first mode is a low-  
2 power mode in which the thermo-electric cooler dissipates less than 5 Watts under  
3 normal operating conditions.

1           22.     The optical transceiver of claim 14 wherein the low power mode  
2 permits wavelength drift within operable parameters.

1           23.     A method for providing thermo-electric cooled system for operating a  
2 laser diode comprising:  
3           operating a laser diode in one of a first mode and a second mode wherein the  
4           choice of mode is a function of a user-defined power and performance  
5           ratio.

1           24.     The method of claim 23 wherein the function is a ratio of power versus  
2 performance wherein the power required to cool a laser diode is compared with the  
3 performance required for one of a plurality of laser diode applications.

1           25.     The method of claim 24 wherein the plurality of laser diode  
2 applications include time division multiplexing (TDM), dense wavelength division  
3 multiplexing (DWDM) and wavelength division multiplexing (WDM) applications.